

**SYNOPSIS OF COMMENTS REGARDING
JUNE 6, 2003 MERCURY TMDL PROJECT REPORT**

(WITH BRIEF RESPONSES IN ITALICS)

August 25, 2003

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Guadalupe River Interests

**Beau Goldie,
Santa Clara Valley Water District**

Page 1 (of letter submitted)

Additional stakeholder review of the Project Report may be needed.

Having provided about five weeks to compile comments and held a public meeting on July 2, 2003, we believe we have provided an adequate opportunity to review the Project Report, which is just one of several steps in the TMDL process. Another opportunity for review will occur during the next step in our process when we circulate our proposed Basin Plan Amendment and Staff Report for public review and comment.

The report is not based on sound science.

The report is based on available information. To ensure that the Basin Plan Amendment will be based on sound science, it and its accompanying Staff Report will be subjected to scientific peer review.

The TMDL should establish measurable goals.

The targets and allocations represent measurable goals.

Allocations should be feasible.

Allocations must be set so as to attain water quality standards. They need not be feasible. The implementation plan must be feasible. We will consider economics in the Staff Report.

Page 2

The TMDL should treat the South Bay as a separate water body different than rest of bay.

This would require a more complex model than the simple box we assumed. If a good multi-box model becomes available, we'll incorporate its results through adaptive management. Because the Guadalupe River strongly influences sediment mercury concentrations in the South Bay below the Dumbarton Bridge, a multi-box model would likely conclude that large reductions (like those currently proposed) are needed to meet targets.

The linkage analysis is flawed. Sediment is not an appropriate surrogate. Rudd et al. 1983 doesn't apply because it relates to a freshwater river. The method Rudd et al. 1983 used to measure methylation rates is invalid and has been replaced by more sensitive radio-labeling. USGS 2001c refers to freshwater sediment throughout U.S., and it comes to conclusions contradictory to the linkage analysis.

The report is based on available information. We will incorporate new information as it becomes available. The reference to USGS 2001c in the Project Report is an error. USGS 2001c compares the relationship between sediment mercury and fish tissue mercury in several different types of water bodies. Not surprisingly, that study did not find a clear relationship that applied to all water bodies. This does not discount the potential for correlation within a particular water body. The citation should have referred to the more recent study USGS 2003b, a document with nearly the same title that was inadvertently left out of reference list (USGS 2003b, "A National Pilot Study of Mercury Contamination of Aquatic Ecosystems along Multiple Gradients," prepared by Krabbenhoft et al.).

All mercury is not the same.

This is true, of course, but our analysis assumes that mercury can be converted among its various forms; therefore, all mercury has the potential to be converted to methylmercury. Moreover, data are not available to determine the ratios among the different mercury species for many of the sources and losses considered in the report.

Page 3

Without a semi-quantitative understanding of methylation, costly mitigation may not produce benefits.

The linkage analysis is based on available information. The report recognizes that many factors affect methylation rates. The adaptive implementation plan includes measures to gain a better understanding of methylation so as to ensure that mitigation actions produce appropriate benefits.

Board staff should review literature suggesting that "new" mercury enters the food web more quickly than sediment-bound mercury.

We have reviewed some of this literature and cited it in the report. We found that this was an area worthy of further study. We will review and incorporate new information through the adaptive management process. In time, the information may become sufficient to adjust the allocation scheme. At this time, however, the available information is insufficient to allow us to adjust the allocation scheme to account for differences in biological uptake.

Page 4

The report should use the District's studies and existing models to estimate Guadalupe River sediment loads. Available information provides the proportion of watershed sediment dredged from the river. Over the next 50 years, bay sediment will cause the floor to rise 1 to 1.5 feet in the Alviso portion of the channel; watershed inputs will contribute 0.1 to 0.5 feet. Above Tasman Drive, all sediment removals are from watershed. Silts and clays are least controllable and they're all that leaves the Guadalupe River. The average annual silt and clay reaching the bay is 37,000 tons (33.6 M kg/yr), 75% of TMDL estimate.

According to page 9-4 of SCVWD 2000 (cited in the report), the average annual silt and clay load is about 37,075 tons. The sand load is about 133 tons. The total, therefore, is about 33.7 M kg/yr. This is lower than the 44 kg/yr we estimated in the report using USGS 1980. It is fairly close, however, considering the overall uncertainties inherent in such estimates. The value that best represents current long-term conditions is unclear. While both SCVWD 2000 and USGS 1980 are reasonable estimates, unpublished results from a current SFEI study estimating the Guadalupe River mercury load suggest that the average annual mercury load could be as much as twice as high as the 106 kg/yr estimated in the report. However, these results, which represent only one year of data, are preliminary and subject to change. For now, we intend to rely on USGS 1980, which is consistent with the method we selected to estimate overall storm water sediment loads elsewhere in the report. We will refine the Guadalupe River watershed load through the adaptive management process as we implement the TMDL. In any case, the goal of the TMDL allocation will be to meet the sediment target at the outlet of the Guadalupe River.

Page 6

The TMDL should incorporate into load allocations existing actions that already reduce mercury loads. The allocations should account for erosion repair and control since 1980 and flood protection projects that reduce sediment, stabilize beds and banks, and improve habitat, including shading. The report should give credit for early implementation. The district removed 40 kg mercury in 2002. The district will remove 340 kg mercury in the next 10 years. The lower Guadalupe project will remove 440 to 540 kg mercury. The 2001 Creek Restoration removed 422 kg mercury and included measures to reduce methylation. The downtown bypass project reduces sediment discharges. Projects not in the Guadalupe River watershed removed 25 kg mercury.

The report acknowledges that such activities occur in the Guadalupe River watershed, and we will consider further acknowledging such activities in the Staff Report. We could change the source assessment estimate to account for these activities, but the appropriate adjustments may be difficult to determine. SFEI is developing a more robust load estimate for the Guadalupe River that we will review through our adaptive management approach. We can meet with the District to determine how best to account for past and future load reduction activities as the Guadalupe River TMDL is developed.

Page 7

Flow from 40% of the watershed is controlled by dams. The river appears to be sediment starved due to urbanization, contrary to TMDL assumption that urbanization increases sedimentation. Therefore, the estimated sediment load is too high.

The dams were constructed prior to the studies of sediment loads (SCVWD 2000). The issue of urbanization was used to determine how to break out urban and non-urban storm water runoff from the Guadalupe River watershed load. This adjustment did not change the overall watershed load substantially. As discussed above, there are different ways to estimate sediment loads, some of which result in lower estimates. However, we believe our mercury load estimate is reasonable, particularly given our understanding of SFEI's preliminary unpublished findings.

Page 8

Additional details are needed on the specifics of the proposed remedial actions to assess their effectiveness.

We do not intend to specify the methods or means of remediation. We prefer to preserve flexibility so implementation actions can be modified to optimize their effectiveness.

Removing riparian soil could affect vegetation and fisheries habitat.

This issue should be considered before any plan to remove soil from riparian areas is undertaken. The TMDL will not directly require such actions.

Page 9

Use of long-term averages is acceptable.

Comment noted.

The first sentence under “Guadalupe River Watershed” on page 45 should have said “44 kg” instead of 53 kg.

We’ll change this for the Staff Report.

**Todd Maiden,
Seyfarth Shaw Attorneys (Guadalupe Rubbish Disposal Company)**

Page 1

The allocations should be apportioned more equitably. Reductions from bed erosion and Central Valley are relatively small, at 31% and 47%. The report says a 50% reduction in all sources needed.

A 50% reduction in all source loads is not needed to reduce concentrations in the bay by 50%; the 42% load reduction proposed will be sufficient to meet targets. As shown in Table 7.1 (and the commenter’s table), the reductions for bed erosion and the Central Valley watershed are 52% and 25%. We will consider a more “equitable” allocation scheme in our alternatives analysis.

Page 2

The report provides no rationale for the proposed allocation scheme. The allocations are based on sediment target of 0.2 ppm. Many possibilities are available, and many factors should be considered that haven’t been.

As noted in the comment, the report explains that the rationale for most of the allocations is based on the sediment target of 0.2 ppm. The allocation scheme is based on what is necessary to meet water quality standards, not feasibility per se. We will consider some alternative allocation schemes in the Staff Report.

Page 3

The Guadalupe River data are old and inappropriate. They do not account for more recent cleanup activity. Plus, there are too few samples to estimate a sediment mercury concentration.

These are the only sediment mercury concentration data available. We must infer what we can from the available information. Downstream mercury concentrations may not yet fully reflect the upstream cleanups. Studies are underway to refine the load estimate and these will be accounted for in the future through adaptive management.

Page 4

The load estimate does not account for the water district’s removal actions.

Available data are insufficient for us to estimate the benefits of these actions. Credit for these actions can be given when determining progress toward meeting the allocation.

The more stringent narrative objective for bioaccumulation does not apply because a less stringent numeric objective (USEPA’s CTR) is available.

The narrative objective is not necessarily more stringent than the numeric objective. Moreover, the narrative objective still applies when a numeric objective exists. More importantly, the TMDL is based on protecting beneficial uses. The numeric objective is an aquatic life objective and does not directly drive the targets or the

allocations, which are intended to protect human health, wildlife, and rare and endangered species from bioaccumulation.

The report does not account for background concentrations in the Guadalupe River watershed.

We estimated the background load (non-urban runoff) using Bay Area data and removed this from the Guadalupe River watershed load so it would only relate to the mining legacy. We don't have watershed-specific background data for the Guadalupe River. It is possible that background levels are higher in the Guadalupe River, but this is unlikely to result in a substantial difference in the mining legacy load. While natural cinnabar does contribute to the load, the much greater part of the load probably results from mercury mining wastes deposited in the watershed. Moreover, according to SFBRWQCB 2003f (cited in the report) sediment mercury concentrations in deep cores dug relatively near the mouth of the Guadalupe River suggest that pre-mining concentrations were about 0.08 ppm, which matches the Bay-wide estimate of 0.06 ppm reasonably well. Therefore, we doubt that much if any of the Guadalupe River watershed load results from background weathering of cinnabar.

Pages 5 and 6

The implementation plan offers insufficient practical guidance.

The solution to the mercury problem needs to be flexible enough to accommodate new information and implementation options. We do not intend to mandate the method or means of compliance with requirements stemming from the TMDL. The Guadalupe River TMDL may also provide more detail regarding implementation options for the Guadalupe River.

The report recommends no reduction in atmospheric deposition, which should get a lower allocation.

We would like to see lower atmospheric deposition loads. A substantial portion of these loads comes from global sources. Reductions may occur as a result of national and international efforts. However, available information is insufficient to quantify these potential reductions or reductions that could be possible by reducing local mercury emissions. The plan calls for continued study.

The report needs to consider cost effectiveness.

We will evaluate economic factors in the Staff Report as required by our administrative procedures.

Board needs to comply with administrative procedures.

We intend to.

NPDES Dischargers

Donald Freitas,

Bay Area Stormwater Management Agencies Association

Pages 1 and 2

BASMAA needs 6 to 9 months to review the Basin Plan Amendment when it becomes available.

We will provide a comment period of at least 45 days as required by our administrative procedures. Because the Basin Plan Amendment will be based largely on the Project Report (the subject of these comments), BASMAA will have had several months to consider the information underlying the Basin Plan Amendment when it is proposed.

The Board must comply with CEQA.

We will include the CEQA checklist with the Staff Report as required by our administrative procedures. The Staff Report will also include an analysis of alternatives and economic factors. We sought input regarding the scope of the CEQA analyses at a public meeting October 31, 2002. To date, we have not received any specific comments from any stakeholder regarding the scope of the CEQA analyses.

Suggested revisions should be incorporated into a revised report.

Where appropriate, we will incorporate changes into the Basin Plan Amendment and Staff Report, but we will not revise the Project Report.

Communication efforts have not been meaningful. Peer review and public review are important. Issues could be resolved already if a process for ongoing discussions had been established.

We shared information as it became available. We have involved BASMAA for years through the Mercury Watershed Council. Most recently, BASMAA participated in a public meeting held October 31, 2002; two meetings just with BASMAA; and a public meeting held July 2, 2003. We have also communicated with BASMAA through the CEP and numerous personal exchanges among staff. Our web site provides recent TMDL reports and presentations. Scientific peer review and public review are formal steps in our administrative procedures. The proposed Basin Plan Amendment will go through both of these steps.

Page 3

The significant changes made since June 2000 and October 2002 demonstrate that communication is lacking. These changes were not discussed with the storm water programs prior to release of the Project Report. Stakeholders should be updated prior to public releases.

The changes are the direct result of re-assessing the storm water load due to comments we received from BASMAA participants in 2002. For example, we incorporated the results of the Joint Stormwater Agency report where we felt it was appropriate to do so. As a public agency, we do not necessarily believe it is appropriate to share all calculations with BASMAA prior to sharing them with the public at large. Every member of the public is a stakeholder with a right to review documents as they are prepared. Therefore, giving all stakeholders a preview is tantamount to moving the public release date forward.

Stating that the report will not be revised discourages comments. Board staff have not responded to past comments. All “informal” comments deserve a response.

Although we will not revise the Project Report, we will make changes where appropriate to the Staff Report, which will be based largely on the Project Report. BASMAA input has not been ignored. Staff has carefully considered all comments from BASMAA and other stakeholders and incorporated them as appropriate. We will continue to do so.

Page 4

The word “controllable” is used inconsistently throughout the report. Indirect atmospheric deposition and runoff are deemed “controllable,” whereas direct atmospheric deposition is deemed “uncontrollable.” The word needs to be defined on the basis of feasibility, economics, and jurisdiction of dischargers.

“Controllable water quality factors” is defined in the Basin Plan. We have reviewed our use of the word and believe it is consistent. We will explore ways of responding to the “spirit” of this comment by clarifying the text where possible.

Storm water agencies cannot control mercury from atmospheric deposition.

To the extent that directly connected impervious surfaces convey runoff, the portion of the mercury deposited indirectly on the watershed that runs off is “controllable.”

Page 5

The report doesn’t adequately address uncertainty. Inherent assumptions and uncertainties should be expressed throughout the report. The report should include a sensitivity analysis to illustrate how the bay would respond under different assumptions.

We have acknowledged where available information is limited, accounted for an implicit margin of safety, and allowed implementation flexibility through adaptive management to accommodate new information as it becomes available. A quantitative sensitivity analysis is unnecessary and would be difficult due to limited information regarding the range of uncertainty for the largest sources (e.g., bed erosion). The alternatives analysis will seek to describe some alternative scenarios. We believe the existing analysis is adequate.

The report should account for losses in the same way that it accounts for sources (i.e., Table 7.1 and Figure 7.1 do not include the loss terms include in Table 4.1 and Figure 4.1).

The loss terms are Golden Gate transport, evaporation, and dredging. These loads will change over time as the bay’s sediment mercury concentration decreases. However, with the exception of dredging, we cannot directly control these losses. Dredging will be subject to the LTMS, so the source load component of this net loss will decrease accordingly. This reduction is described on page 68 of the Project Report. The presentations in Table 7.1 and Figure 7.1 are intended to simplify the information so it is easier to understand. Accounting for losses differently would not affect the attainment of water quality standards.

Allocations should be based on loads, not concentrations.

TMDL regulations allow us to allocate on the basis of loads or concentrations. The proposed allocations are expressed as loads. Concentrations were used to support the rationales for selecting some allocations. Allocations for sources without significant sediment loads, which account for a relatively small portion of the total load, remain at existing levels, at least until rationales can be developed to reduce them.

Page 6

The science does not support any allocation scheme other than requiring each source and loss to be reduced by the same relative amount.

Various allocation schemes are conceivable. We can explore BASMAA's proposal through our alternatives analysis; however, as discussed below, we cannot justify breaking out 55 kg/yr for indirect deposition since it is unclear that the entire 55 kg/yr returns to the bay through runoff. As we will discuss in the alternatives analysis, this allocation scheme may result in unacceptable local effects if incoming sediment above the sediment target is allowed to enter the bay.

Losses (negative loads) need to be maintained.

We cannot control any mercury loss term except dredged material disposal, which we believe will decrease from 150 kg/yr to about 430 kg/yr due to the LTMS. Transport through the Golden Gate will decrease as the concentration of mercury in the bay decreases. The same may be true for evaporation.

Page 7

State that mercury is a global problem.

We will consider adding this context to the Staff Report.

State that the complexity of the system could greatly undermine the assumptions and calculations made using the one-box model. Describe the disadvantages of the one-box model.

We have described the complexity of the system and how the model simplifies things. Having done so, we have acknowledged the differences between physical reality and the model. We believe this is adequate and reasonable.

Page 8

Include preliminary estimates of bed erosion from locations other than San Pablo and Suisun Bays. Bed erosion may be underestimated.

The desired information is unavailable. We do not intend to speculate in areas where we have no information. This information is being developed, however. Unfortunately, it won't be ready in time for the Basin Plan Amendment. Thus we intend to rely on adaptive implementation to incorporate this information when it becomes available.

Bed sediment data should not be used to estimate storm water sediment mercury concentrations. The report should discuss the appropriateness of using bed sediment versus suspended sediment. Procedures for refining the estimates should be provided.

This is the only data available, so we must rely on what we have. SFEI estimates for storm water runoff can be incorporated through adaptive management when available. The TMDL will provide for flexibility in refining the load estimates.

Page 9

Break out 55 kg/yr from the storm water load estimates.

The portion of the 55 kg that runs off (verses lodging in soil or elsewhere and not running off) is unknown. More importantly, when storm water conveyance systems capture and discharge mercury deposited in the watershed, this mercury becomes controllable to some extent.

A more detailed linkage analysis is needed to quantify the percent of mercury transported to methylating regions; the percent and rates of methylation; and the percents, rates, and risks posed at various trophic levels.

Sufficient information is unavailable to quantify these relationships meaningfully. We hope that future studies undertaken by the CEP, the RMP, and others will help us resolve these issues through adaptive implementation.

Page 10

Revise the text on page 36 of the Project Report to put storm water runoff in proper context compared to other sources.

We will consider this change for the Staff Report.

Rephrase and qualify “Reducing mercury loads will reduce methylmercury production.”

We will consider this change for the Staff Report.

The total of the load and wasteload allocations in Figure 7.1 is incorrect.

We will change this for the Staff Report.

Page 11

Is indirect deposition’s contribution to runoff controllable? Who has jurisdiction?

It may be possible for the Board to use its authorities (or leverage the air district or air board to use their authorities) to control atmospheric deposition, but the effort necessary to obtain meaningful reductions may not be reasonable. Additional information is needed. When mercury deposited indirectly on the watershed is captured with storm water, it becomes controllable.

Delete references to thermometers. There is no evidence that they contribute to mercury in runoff.

We will consider this change for the Staff Report, but BASMAA may wish to keep this option open.

Population may not be the best way to decide on individual wasteload allocations for storm water permittees. Percent of urban land area may be a better measure. BASMAA would like to work with the Board to devise a better scheme.

The population-based scheme may be one of the easiest to update over time, but we are open to any specific suggestions BASMAA puts forth.

Page 12

The report refers to a total current mercury input of 1,420 kg/yr in some places and 1,220 kg/yr in others. Was 1,420 kg/yr used in the recovery scenarios?

The correct number is 1,220 kg/yr. It was used in the recovery calculations. We will correct any errors in the Staff Report.

An objective of the plan is to consider the feasibility and cost of control, but the costly storm water allocation does not appear to be feasible.

Allocations must be based on water quality concerns. They need not be economically feasible. However, implementation actions must be feasible and affordable. The Staff Report will consider the economics of foreseeable implementation alternatives.

Page 13

The links between implementation actions and load reductions are unclear. Clearly identify early implementation actions. Attachment 1 proposes permit requirements for Phase 1 storm water programs.

We do not intend to specify the methods or means by which the storm water programs will attain their allocations. The burden will be on the storm water permittees to select the most cost-effective options. We appreciate that BASMAA is considering how the TMDL will be translated into permit requirements. We can resolve permit conditions when changes to the permits are considered.

BASMAA is concerned about complying with its allocation in quantitative terms, particularly since baseline data are unavailable. How often must the five-year average be calculated? How will this be coordinated with the 5-year TMDL review?

Quantitative estimates are needed to determine the effectiveness of proposed actions and to track co-permittee compliance. The 5-year average would be calculated every 5 years (i.e., it would not be a moving average).

Data used to estimate loads is two years old. This could affect how storm water agencies account for loads avoided. BASMAA wants credit for early implementation efforts.

The data used to derive the TMDL loads defines a baseline condition. Therefore, early implementation actions taken within the last two years should qualify for credit. The details regarding how load reductions will be quantified remains to be developed. The Staff Report should retain flexibility to work out these details with BASMAA.

Wastewater treatment plants are unlikely to accept wet weather storm water runoff for treatment.

Delete these references or add this to the wastewater section too.

We would like to preserve this as an option, but we do not intend to require it per se. We will consider this change for the Staff Report.

Page 14

The text on pages 69 and 70 should mention “immediate” actions or “early implementation” actions.

We will consider these changes for the Staff Report.

Expand the discussion of the 5-year reviews. Concerns expressed now, if not incorporated into the TMDL, should be re-evaluated at these opportunities.

Page 70 of the Project Report already includes a provision for these and other stakeholder concerns to be considered during the 5-year reviews. The scope of the reviews will be determined through consultation with stakeholders when the time arises.

Add a paragraph to page 76 regarding the need to refine the sediment target using the studies from management question five (food web linkage).

We will consider this change for the Staff Report.

James Scanlin, Alameda Countywide Clean Water Program

Pages 1 and 2

The goals and targets must be flexible enough to allow changes when new information becomes available. Numeric results of mercury reduction actions cannot be assured.

The TMDL needs to have quantitative goals against which we can measure success. Some level of quantification is needed to ensure that management efforts are worth the efforts put into them. An adaptive management strategy is proposed to ensure that satisfactory progress is being made.

The storm water mercury load estimate is based on data collected for a different purpose and not meant to estimate loads. The report should state the 95% confidence interval surrounding the 160 kg/yr estimate.

The estimate is the product of the sediment mercury concentration and the sediment load. While the concentration data is sufficiently robust to allow a statistical analysis, the sediment load estimate is not. For the concentration data, the 95% confidence interval about the mean (0.43 ppm) is 0.30 to 0.56 ppm; however, this includes the one extreme sample collected from a location potentially influenced by the high mercury concentrations of the Guadalupe River.

The report does not show that the proposed implementation actions will result in the needed load reduction. Pollution prevention promoting lamp and thermometer recycling seems reasonable, but diverting flows to treatment plants or treating storm water to remove mercury may be infeasible or ineffective.

We do not intend to specify the method or means of meeting the allocation. The report provides examples that the storm water programs could consider. Ensuring the link between actions and load reductions will be the responsibility of the storm water management agencies.

Page 3

The new “new development” permit requirements may address new loads, but cannot address most existing sources.

How load reduction credit is allotted for “new development” controls is something that needs to be worked out through the permitting process. The TMDL should be flexible enough to allow consideration of such factors.

Primary methods of controlling sediment are detention basins and treatment wetlands, but these may increase methylation.

In addition to detention basins and treatment wetlands, erosion control options exist. Choices are also made regarding where development occurs and how development results in hydromodification. The potential for some options to contribute to methylation should be considered when selecting among various approaches.

The allocation scheme is unfair to storm water and Guadalupe River mining legacy. We support BASMAA’s allocation proposal.

We will consider a similar alternative in the alternatives analysis that is part of the Staff Report.

Dredged material disposal should get an allocation. Dredged material contains 0.37 ppm mercury. This concentration should be reduced to 0.2 ppm.

Dredging received a strictly mass-based allocation instead of an allocation derived from a single concentration. For dredging, the load reduction comes from implementing the LTMS and from the combined efforts to reduce overall sediment mercury concentrations in the bay. The concentration of mercury in dredged material reflects the prevailing mercury concentration in bay sediment; therefore, it is expected to decrease as external loads decrease and bay sediment concentrations decline. The benefits of reducing mercury from dredged material disposal are limited to accelerating target attainment, not meeting targets. As reflected in the recovery curve discussion on pages 49 to 51 of the Project Report, disposing of dredged material outside the bay reduces the amount of sediment that would otherwise exit through the Golden Gate due to the steady-state assumption explained in Section 3.

The report considers atmospheric deposition to be uncontrollable. Therefore, the 55 kg/yr deposited on the watershed should be removed from the storm water load and allocation, and listed separately.

The portion of the 55 kg/yr falling on the watershed that runs off with storm water is unknown. We know that it is less than 55 kg/yr because not all the mercury deposited on the surface runs off. More to the point, although mercury emissions may not be readily controllable to any appreciable extent, mercury deposited on the watershed becomes controllable when it is captured by a storm water conveyance system. If storm water management agencies believe controlling local atmospheric emissions will substantially reduce their runoff loads, we would support their efforts to undertake the studies necessary for the air district to use its regulatory authorities.

Atmospheric deposition should receive a nominal reduction in its allocation. If no reduction is assigned, it will be difficult to add later.

Little information is available on which to decide what reduction should apply. More information is needed. A reduced allocation is possible if appropriate information becomes available.

Page 4

The Basin Plan must spell out clearly how new studies will address management questions, how stakeholder involvement will be coordinated, and how the TMDL direction can be changed if needed.

The Staff Report will address how new studies will address management questions in a manner similar to the Project Report. The Basin Plan Amendment will be briefer. It will provide guidance while allowing sufficient flexibility to respond to evolving information. Our hope is that the text of the Basin Plan Amendment will provide maximum implementation flexibility by accounting for the adaptive management approach.

Michael Carlin, San Francisco Public Utilities Commission

The TMDL needs to incorporate credit for San Francisco's removal of mercury from storm water. San Francisco removes about 60% of the solids from its storm water prior to discharge.

We didn't incorporate this treatment into the source assessment because, at the time, we didn't know how much removal there was. If San Francisco were to substantiate the statement in this comment, we could adjust the storm water load estimate. It would be easier for us, however, if credit for this treatment were applied to the allocation as part of the implementation plan. It seems that 60% solids removal should account for San Francisco's reduction responsibilities and may even provide some reductions for other storm water programs. We'll try to clarify this strategy in the Staff Report and Basin Plan Amendment.

Targets may not be reached for 120 years, but the Clean Water Act says standards must be met before water quality-based effluent limitations can be changed.

The Clean Water Act says standards must be met or a TMDL must be in place. Water quality-based effluent limitations must be consistent with the assumptions and requirements of TMDL waste load allocations.

Bay Area Clean Water Agencies

Page 1

Section 2 of the Project Report says mercury poses a threat to humans and wildlife. Other places are more definitive about the level of harm. Clarify that mercury is a threat but no definitive proof of poisoning humans or wildlife exists.

We will consider such changes for the Staff Report.

Qualify the targets discussion to clarify that changing the targets in the future does not necessarily mean the bay is unprotected.

We will consider whether clarification is needed in the draft Basin Plan Amendment.

Add parallel language to each source's implementation plan regarding the need to study fate, methylation, bioavailability, and local effects. Link these studies to the RMP.

Parallel language already exists for urban runoff, dredging, wetlands, and bay margin contaminated sites. We have not proposed this for sources for which TMDLs are underway (e.g., Guadalupe River and Central Valley).

Page 2

BACWA supports monthly average triggers, but not daily concentration triggers. Also, add re-sampling as a confirmation step when a trigger is exceeded.

The daily trigger is intended to serve as a check against possible short-term problems with a plant's operations and possible local effects. Re-sampling does not seem reasonable if an incident has already passed.

Credit should be given for significant mercury reductions (e.g., household hazardous waste collection) and nontraditional source control programs. We support a fully voluntary "watershed approach."

We support the concept of a credit program, but the details need to be worked out regarding how to provide credit. We will discuss these details with stakeholders when appropriate.

Dredging Interests

Jim McGrath, Port of Oakland

Page 1

The report would benefit from a closer relationship between conceptual model presentation and descriptions of near-term research goals.

In the adaptive management portion of the implementation plan, we describe how near-term research goals relate to key simplifications and assumptions.

The relationship between sediment mercury and the food web is unproven. USGS 2001c says there's no correlation between the two.

That citation was an error. The report should have cited USGS 2003b, which was inadvertently left out of the reference list. USGS 2003b says the two are correlated, so long as the sediment mercury concentration is relatively low, as it is in San Francisco Bay.

The details of getting from average sediment concentration to any particular biotic tissue concentration probably sort out at a smaller scale than that of an entire watershed, and may turn out to be very site-specific. The "Key Points" on page 41 are OK; similar text should be added to page 35. Also, Sections 3, 4, 5, and 6 should refer to research topics listed in Section 8.

We will consider these changes for the Staff Report.

The report often oversimplifies complexities. Although it's clear the authors understand the complexities, text could be added to assist the reader. Define "linkage" since it's used in more than one context.

We will consider such changes for the Staff Report.

Page 2

The bed erosion load is probably understated. Naturally bedded sediment is likely 70% solids.

The 50% or 70% assumption reflects a variable and uncertain system. Both estimates appear reasonable. The 70% assumption leads to bed erosion being a relatively greater source. This assumption would also increase the apparent benefit of bed erosion eventually slowing in about 110 years. Because bed erosion is an uncontrollable process, the 50% assumption is more conservative than the 70% assumption. The 50% assumption leads to greater emphasis on the other sources. The 70% assumption would substantially decrease the initial slope of the recovery curve in Figure 7.2, but the bend in the curve after 110 years would be more substantial. In other words, if accurate, this alternative assumption would mean that the benefits of other source reduction efforts would be more difficult to observe in the earlier years of implementation.

The Weast and Elert citations should clarify that these are sources for specific gravities, not calculations.

We will consider these changes for the Staff Report.

The concentration of mercury removed from the bay is understated; 0.37 ppm may reflect maintenance dredging, but channel deepening may involve concentrations of 0.7 to 1.6 ppm.

Channel deepening removes sediment below what we've assumed is the active layer (15 cm); therefore, it's moving sediment below the box, through the box, outside the box, or, if disposed of in the bay, this high-mercury sediment increases the dredging source term. Channel deepening is not routine. The report focuses on maintenance dredging, which removes a portion of the active layer and exposes the sediment buried below.

According to a personal communication with Lester McKee, the Guadalupe River load is understated.

These new data are preliminary. They relate to one year of measurements that followed an extended period of dry weather, so they may not be representative of long-term conditions. This new, evolving information will be considered through the adaptive management process.

The loss terms in Table 4.5 should have minus signs.

We believe the text is clear as shown since losses are separated from sources and labeled accordingly.

The report should acknowledge the uncertainties regarding depth of the active layer and mercury concentration in the active layer, and identify these as research priorities. Figure 6.1 is too simplified. Perhaps label it the "one-box methylation model." A more detailed conceptual model combining a water body model with a methylation model would better focus research.

We will consider how best to acknowledge uncertainty regarding the active layer for the Staff Report. Study priorities are listed where immediately relevant to the regulatory process. However, the primary goal of the TMDL is not to focus research. Figure 6.1 is intended as an illustrative guide to the linkage analysis discussion. It is not intended to represent a detailed conceptual model.

Mentioning the potential for dredged sediment to enhance biological uptake appears gratuitous, and the suggested permit requirement is inappropriate. Maintenance dredging may reduce bioavailability by allowing contaminants to settle out of the planktonic environment for a year or more at a time. Any additional biological uptake would be insignificant in light of all the other sources of mercury.

We believe the potential for dredged sediment to enhance biological uptake is a reasonable subject for further study. This requirement is consistent with those proposed for other sources. The dredging community already participates in efforts that could be recognized, in whole or in part, as satisfying these obligations.

Page 3

Research priorities should lead to a rational view of the relative contribution of dredging to the system. Add a research goal of investigating shear stress to allow a better estimate of the active layer depth.

Page 74 of the Project Report discusses the goal of improving our ability to model transport processes. Depth of the active layer and characterization of shear stress are integral components of transport modeling.

If efforts to control methylation in wetlands fail, upland disposal of dredged material may be impractical. We recommend that the LTMS also be adaptively managed.

This TMDL process and the proposed Basin Plan Amendment do not seek to formally adopt or modify the LTMS, which is an entirely separate program.

**Ellen Johnck,
Bay Planning Coalition**

The Bay Planning Coalition agrees with the report's accounting of dredging sources and losses (which results in dredging not receiving a source allocation). We agree that transport out the Golden Gate being a loss.

Comment noted.

The LTMS is a target, not a regulation. The TMDL should not require the LTMS as a requirement.

The TMDL does not adopt the LTMS through the "back door"; however, it does consider the LTMS to be reasonably foreseeable since it has been adopted by many agencies and is currently being implemented. Where possible, the TMDL relies on reasonably foreseeable actions to help address the mercury problem, including actions implemented through the LTMS.

The implementation plan proposes new requirements on dredging permits, NPDES permits, and wetlands projects but does not clearly define them.

Opportunities to refine these requirements will occur when permits are proposed. The Basin Plan Amendment will not dictate the detailed provisions of the permits.

The new requirements relate to scientific studies. These should be funded through the RMP.

Many funding mechanisms are possible, including the RMP.

Environmental Organizations

**Leo O'Brien,
Waterkeepers Northern California**

Pages 1 and 2

The implementation time line (120 years) is too long.

The implementation schedule is not 120 years. We have assumed that substantial load reductions will occur over the next 20 years. This is an aggressive schedule in light of the reductions that need to happen. There is already so much mercury in the bay that it will take decades to reach the proposed targets even if all mercury sources could be stopped. This is impossible, however, because mercury occurs naturally in sediment entering the bay from rivers and creeks. The Clean Water Act does not dictate a time frame for recovery. Although it will probably take decades to reach the proposed targets, a proposed implementation activity is to collaborate with other California agencies to help manage risks to consumers of mercury-contaminated fish from San Francisco Bay.

Allocations must be made to individual sources, not categories. The group allocations allow some dischargers to increase their loads as long as other decrease theirs. No dischargers should be allowed to increase until assimilative capacity is available.

The report includes individual allocations for each permitted discharger to San Francisco Bay. Individual loads can increase so long as the increase is consistent with the assumptions underlying the TMDL.

Permits need to be "equal to or less than" allocations, not just "consistent with" them.

This interpretation of the Clean Water Act is not supported by the text of the Clean Water Act, which uses the expression "consistent with."

Page 3

Averaging wastewater loads over five years is illegal. The TMDL must be expressed as a "daily" load. Permits should have daily mass limits.

Federal regulations say TMDLs may be expressed in terms of “mass per time,” “concentration,” or any other appropriate measure. They do not require TMDLs to be expressed as “daily” loads per se. Our TMDL is expressed as an “annual” load, but the “annual” load is understood to be a long-term average condition because the effects of mercury bioaccumulation occur over many years. Evaluating annual loads using a five-year average accounts for inter-annual variations. It is not the same as a five-year allocation. There is no requirement that permit conditions implementing TMDLs be expressed as daily mass limits. However, we have proposed daily and monthly concentration triggers, which will serve a similar purpose.

Page 4

The proposed averaging scheme would allow some dischargers to increase loads.

Overall loads would not exceed the assumptions on which the TMDL is based.

Controllable sources should receive the smallest possible allocations. Water quality standards must be attained immediately. Bed erosion absorbs all the assimilative capacity, so all other loads should receive zero allocations.

TMDLs must be prepared, but they need not attain water quality standards immediately. In fact, in the case of San Francisco Bay, mercury targets could not be achieved immediately even if all mercury inputs were to cease. Nevertheless, we will explore such an alternative allocation scheme in the Staff Report.

Page 5

The TMDL needs to lock wastewater treatment plants into current performance.

The plants will maintain current performance as a category and, because the proposal is to include performance-based triggers, they will maintain current performance individually as well.

The TMDL needs implementation actions for bed erosion. Board staff have claimed that they don't expect to see reductions in bed erosion loads for 20 to 30 years.

In general, bed erosion is an uncontrollable natural process. To address it specifically would require substantial dredging of the bay floor, capping the floor with erosion-resistant material, or causing extreme sediment flows into the bay to ensure deposition. All these options would be phenomenal engineering feats. None is feasible, and none is reasonable in light of the severe environmental harm that would be posed to the bay's beneficial uses. Therefore, we have not proposed specific measures to address bed erosion. We expect the mercury load from bed erosion to decrease over time, but that process will take much longer than 20 to 30 years.

Wasteload allocations can only replace water quality based effluent limitations and performance based effluent limitations if they are more stringent. NPDES permits must contain water quality based effluent limitations until the targets are achieved.

Our interpretation of the Clean Water Act is that water quality based effluent limitations must be consistent with the assumptions and requirements of wasteload allocations. Allocations must be based on what is necessary to attain water quality standards. Allocations need not be based on existing water quality based effluent limitations or performance based effluent limitations.

Page 6

The TMDL should assign load reductions to local air sources. The report claims quantifying loads from local air sources is infeasible. Evidence suggests that air sources contribute significantly to bay mercury concentrations. The Board has authority under the Clean Water Act to regulate air sources.

We quantified the load from atmospheric deposition and proposed an allocation. We didn't assign load reductions because (1) they are not necessary to meet the targets and (2) national efforts (e.g., Clear Skies, Quicksilver Caucus, etc.) are underway that will hopefully reduce atmospheric mercury concentrations, even if such reductions are not quantifiable at this time. The 27 kg/yr is not especially significant when compared to the other sources. The implementation plan does call for further study in this area.

Page 7

How will the Central Valley's allocation be imposed? What if Central Valley TMDLs include different load allocations? The Central Valley Board's Basin Plan should be amended at the same time as the Bay Area's Basin Plan is amended. Likewise, the Guadalupe River TMDL should be adopted at the same time.

When approved by the State Board, our allocation will become an “end of pipe” requirement for the Central Valley Board and it must be considered in Central Valley TMDLs. Coordinating simultaneous Board actions would substantially delay the San Francisco Bay TMDL, which seems contrary to the goals of Waterkeepers’ other comments.

Pages 8 and 9

The bird egg target is insufficiently protective because it is based on a lowest observed adverse effects concentration.

We are working with the U.S. Fish and Wildlife Service to ensure that our target is appropriate given available information.

References to mercury trading should be removed.

The implementation plan doesn’t require trading; it simply refers to it as a possibility. The idea need not be developed fully to justify its mention in the report.

David Beckman et al., Natural Resources Defense Council

Pages 1 and 2

The projected 120-year recovery does not reflect the seriousness of the situation. The 120-year implementation schedule is too long.

The implementation schedule is not 120 years. Given the extent of the problem, it will take a long time for the bay to recover, even with the aggressive implementation plan proposed (allocations to be phased in over 20 years).

Page 3

The TMDL will not meet water quality standards for a long time.

The TMDL will meet the standards eventually, but it will take time. The Clean Water Act doesn’t require any particular recovery time.

The margin of safety is inadequate.

The comment is unclear regarding how the margin of safety is inadequate, except in so far as it suggests that uncertainties are not fully accounted for. We believe the many conservative assumptions made throughout the report and the proposed adaptive management strategy for implementing the TMDL provide an appropriate margin of safety.

The urban runoff allocation should be lower since more can be done.

The allocation is not based on what is feasible to achieve; it is based on what is necessary to attain the targets. In this case, a 48% reduction is needed to attain the sediment target in urban storm water runoff. This reduction is also sufficient to meet the sediment target in the bay overall.

The report doesn’t explain why wastewater loads cannot be reduced.

The wastewater loads are relatively small, and reductions do not appear to be needed to meet the targets. Moreover, wastewater treatment plants already remove a significant fraction of the mercury they receive, so further reductions would be small, would likely take extreme effort, and could be costly.

The allocations should be as low as possible, even if data are inadequate.

While many uncertainties remain, data are adequate to conclude that, in time, the proposed allocations are sufficient to meet the targets and water quality standards. There is no requirement that allocations be as low as possible.

Pages 4 and 5

Water quality standards should have been met a long time ago. The State Implementation Plan (SIP) allows up to five years to comply with TMDL-derived effluent limitations.

The SIP applies to NPDES permits. According to page 19 of the SIP, the SIP requires compliance with effluent limitations based on California Toxic Rule numeric objectives within five years, not TMDL allocations. The SIP allows up to 20 years to develop TMDLs and comply with wasteload allocations derived from them. For this TMDL, allocated reductions will be phased in as soon as possible. Where reductions are very large, the TMDL calls for reductions to be phased in over time (50% in 10 years; 100% in 20 years). However, because we have not proposed that wastewater discharges be reduced, wastewater dischargers will be expected to

comply with TMDL allocations right away. Urban storm water runoff permits do not contain numeric limits, and such limits are not currently proposed. Therefore, the SIP's 20-year compliance schedule does not apply. Nevertheless, the implementation calls for the allocated reductions to be phased in over 20 years.

The implementation plan ignores the Central Valley and bed erosion. Central Valley TMDLs have been delayed. Dredging should occur to address bed erosion. Mercury-laden soil and sediment should be removed from tributaries and hot spots.

The Central Valley is beyond our jurisdiction, but State Board approval of this TMDL (a required step in the TMDL adoption process) will place obligations on the Central Valley Board. The State Board prioritizes TMDL efforts. Bed erosion is a natural process; cleanup will occur without our efforts. Dredging the bay floor to remove mercury in buried sediment could be environmentally harmful and could pose adverse collateral harm through the disposal of substantial volumes of dredged material. The Project Report described an implementation strategy for bay margin contaminated sites.

Michael Stanley-Jones, Clean Water Fund

Page 1

The plan would take 120 years to reach the targets. That's too long for this urgent problem.

The 120 years comes from a very simple model intended only to illustrate that recovery will take a long time. The model assumes that the implementation plan will be fully implemented with allocations will be achieved within 20 years. Given the substantial reductions needed, this plan is aggressive. The targets could be achieved sooner if actions to control methylmercury are successful.

Page 2

The fish tissue and bird egg targets are insufficiently protective. The bird egg target is the bottom of the range of Lowest Observed Effects Levels. Therefore, the target is inconsistent with antidegradation policies.

We set the bird egg target at the concentration above which we thought adverse effects were likely. The target is proposed as an interim target because more information is needed. Knowing the highest no observed effects level would be useful, but this information is not available. We are working with the U.S. Fish and Wildlife Service to ensure that our targets appropriately protect beneficial uses and are, therefore, consistent with water quality standards and antidegradation policies. The comment is unclear regarding why the fish tissue target is inadequate.

The bird egg target offers no margin of safety.

The implicit margin of safety in the allocations is demonstrated by the recovery curves that indicate that sediment mercury concentrations should eventually equal about 0.15 ppm. The adaptive management strategy proposed for the implementation plan provides an additional margin of safety. The bird egg target will be revisited as the TMDL is implemented and new information becomes available. The narrative target proposed in the report offers guidance regarding what would constitute an appropriate bird egg target.

Page 3

Uncertainties about mercury methylation and the potential for the relationship between mercury reductions and wildlife exposure to be other than proportional (i.e., contrary to the report's assumptions) suggest the need for a lower bird egg target.

The bird egg target relates directly to the beneficial use (e.g., wildlife); therefore, uncertainties about methylation or the effects of mercury reductions don't affect the target. This is one reason to include a bird egg target in the TMDL, as opposed to relying solely on a sediment target derived to protect wildlife.

The uncertainties and the inadequate bird egg target call into question the calculated assimilative capacity.

The assimilative capacity calculation reflects the mercury reductions needed to meet the sediment target, which is derived from the fish tissue and bird egg targets. Any changes in the bird egg target could cause changes to the assimilative capacity calculation. However, the more important factor is that the recovery curve demonstrates that the sediment targets will be met with a margin of safety. There is room for the bird egg

target to be reduced, if necessary, if new information were to become available that shows that a change is necessary.

Sediment data should be normalized to percent fines and compared to non-normalized data to establish alternative ranges.

We made judgments about when to normalize data and when not to. We normalized concentration data when bed sediment mercury concentrations were used to estimate suspended sediment loads. We did not normalize data when bed sediment concentrations were applied to total loads (suspended and bed sediment loads). Alternative data are available in the administrative record, which is publicly available upon request.

Pages 4 and 5

The report acknowledges that some “new” mercury entering the bay may be more susceptible to methylation and biological uptake, but does not use this information in allocating loads.

Atmospheric deposition should receive a reduced allocation because these loads could be a relatively larger part of the problem. Facilities emitting mercury into the air could substitute materials and adopt Best Management Practices that could substantially reduce mercury loads.

The idea that newer mercury is more harmful than older, sediment-bound mercury is relatively new. We will continue to study this issue as we implement the TMDL. The portion of local air emissions that reaches San Francisco Bay is unknown. We didn't propose load reductions because (1) they are not necessary to meet the targets and (2) national efforts are currently underway that hopefully will reduce air concentrations. The implementation plan does call for further study in this area, however, to determine if more reductions are appropriate.

The report recommends reducing the Guadalupe River watershed load by about 98%. Similar reductions should apply to other mines, including those in the Central Valley (e.g., New Idria) so they get cleaned up.

The Central Valley suspended sediment mercury concentration doesn't justify a lower allocation since, unlike the Guadalupe River, its discharges are already quite close to the sediment target. Central Valley TMDLs will drive cleanup actions in that region. As for other local mines, the data available are insufficient to clearly conclude that they contribute to San Francisco Bay impairment. However, the implementation plan includes actions to spur investigation. Available data is insufficient to characterize the effect of the New Idria mine (located in the Central Valley Region) on San Francisco Bay.

Other Interests

**Mike Connor,
San Francisco Estuary Institute**

Page 1

Use the “mean” instead of the “median” to evaluate loads and concentration targets.

We almost always use the “mean” throughout the report primarily because we are generally interested in the total mass instead of the central tendency. The one exception is the sediment target, where we wanted to express the central tendency of a data set that is not normally distributed. At a practical level, the target would be 0.2 ppm either way.

Consider some alternative assumptions: (1) set the active layer equal to 5 cm instead of 15 cm, (2) derive a mercury target based on the Basin Plan objective, and (3) use loading rates based on these alternatives and a flushing rate.

Our responses for these three alternatives are as follows: (1) Our goal was to select a reasonable depth for the active layer. Using a 5 cm active layer would result in a lower assimilative capacity, but it would also require less mercury to be removed from the system. The result would be a steeper recovery curve that demonstrates meeting the targets faster. (2) It is difficult to derive a useful target directly from the four-day average numeric objective because of the strong relationship between total mercury and total suspended sediment and the fact that suspended sediment concentrations vary tremendously with both time (daily, monthly, and seasonally) and geographic location. Therefore, it is difficult to directly link the 4-day average objectives to beneficial use

protection. As discussed on pages 33 and 34 of the Project Report, the proposed sediment target is consistent with the water quality objective. (3) Using a loading rate that changes with time is perhaps more complicated than our simple static assumptions. However, we did assume that several sources and losses would change as bay conditions improve.

Page 2

Figure 4.2 (bay sediment cores) shows a decline in mercury, but fish tissue mercury concentrations remain unchanged.

While the mercury concentrations at depth in Figure 4.2 illustrate how typical mercury concentrations in the bay have changed throughout an extended depositional period, Figure 4.2 probably doesn't illustrate current mercury concentration patterns during this net erosional period. The sediment in the upper layer, where concentrations are lower, may have mixed with cleaner sediment. Furthermore, fish tissue mercury concentrations may substantially lag changes in sediment concentrations.

The narrative bird egg target may be insufficient if interpreted to mean “no significant change in concentrations.”

The target is not intended to be interpreted that way. It mirrors the Basin Plan language. It isn't supposed to mean no increases from existing concentrations. Instead, it indirectly refers to increases from background levels. We will consider revising the text to more closely match the text of the bioaccumulation narrative objective.

To verify health benefits to subsistence fishers, mercury data should be collected from them (e.g., from their hair).

While such data could strengthen the connection between mercury in fish and human health risks, it would be complicated without extensive additional information about the diets of the study participants. The fish tissue target, like the USEPA criterion, is intended to be conservative. We are not convinced that we can observe actual harm to humans under existing conditions (thus obviating the need to collect such data), but we are convinced that the risk is sufficient to threaten this beneficial use.

Wetlands, even wetlands that produce methylmercury, may have net benefits if they increase the number of wildlife.

Such factors should be considered when considering wetlands projects. The intent of the implementation plan is to reduce the potential for methylation in wetlands, not to discourage wetland restoration projects.

Page 3

Use a power analysis to determine how soon one would expect to be able to see differences in sediment concentrations.

A power analysis can be used to determine the number of samples that must be collected to determine with “statistical certainty” whether a change has occurred. We will consider such an analysis as part of TMDL implementation.

Luis Arteaga, Latino Issues Forum

Low-income communities experience mercury contamination firsthand. The TMDL implementation timeline should be accelerated.

The implementation schedule is not 120 years. We have assumed that substantial load reductions will occur over the next 20 years. This is an aggressive schedule. There is already so much mercury in the bay that it will take decades to reach the proposed targets even if all mercury sources could be stopped, which is impossible because mercury occurs naturally in the environment. Although it will probably take decades to reach the proposed targets, a proposed implementation activity is to collaborate with other California agencies to help manage risks to consumers of mercury-contaminated fish from San Francisco Bay. We will work with the California Office of Environmental Health Hazard Assessment and the California Department of Health Services in this effort. The risk management activities will include outreach to people who eat bay fish.

Ongoing mercury contamination should end. Mercury should be removed from fuels, industrial processes, and commercial and household goods.

Our plan is to reduce mercury loads as much as we can to attain our targets and meet water quality standards. However, a substantial portion of the mercury entering the bay occurs naturally or results from processes (e.g., bed erosion) that are difficult if not impossible to control. Our plan will affect mercury-containing products, particularly as urban storm water management programs seek to reduce their discharges. The plan also requires petroleum refineries to examine the fate of mercury in crude oil.

Wetland restoration projects should be designed to reduce methylmercury production in the Guadalupe River and the bay.

We are actively promoting research and small-scale pilot projects to determine how methylmercury production in wetlands and other methylating regions can best be reduced.

**Scott Bodensteiner,
MEC Analytical Systems, Inc.**

Additional reference dose studies are needed to confirm the three mercury targets, particularly the bird egg target.

The report acknowledges the need for more information regarding acceptable mercury exposures for birds.

A USACE paper states that wetlands can be methylation sites, and methylation is controlled by sulfide and oxygen levels. MEC confirmed this conclusion. Upland and wetland management practices should be developed to counter methylation.

The implementation plan anticipates the need to better understand methylation so wetland management practices can be developed to counter methylation.